BCT Workshop
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# Air Sparging/Soil Vapor Extraction System

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# Site Conditions - NWIRP Calverton Fire Training Area

| | |
|---|---|
| Geology: | Fine to course sand, with clay lenses |
| Groundwater: | 12 to 16 feet below ground surface |
| Terrain/Vegetation: | 1 to 2% slope, grasses, and lightly wooded |
| Setting: | Rural, no residents within one-half mile |
| Site Use: | Fire training exercises |
| Site Chemicals: | Floating free product layer (0.1 to 1.0 foot thick)<br>Soil contamination (1 acre - 25,000 CY)<br>BTEX to 100 ppm<br>CVOCs to 10 ppm<br>PAHs to 120 ppm<br>PCBs < 10 ppm |

# Site Conditions - NWIRP Calverton Fire Training Area (con't)

| | |
|---|---|
| Site Chemicals: | Groundwater contamination (10 acres)<br>BTEX to 1ppm<br>CVOCs to 1ppm |
| Status: | Pilot scale operating seasonally since August 1995. RCRA Facility Investigation under regulatory review |
| Offsite Issues: | No receptors impacted, contamination at edge of property line |

# Technology

# Setup

- 32 Soil Vapor Extraction Wells
  - Screened 4 to 8 feet below ground surface
  - Plastic sheeting added to extend horizontal influence
- 16 Air Injection Wells
  - 2 foot well screen at 7 to 11 feet below water table
- Soil Vapor Extraction Blower: 5 HP - 200 SCFM
  - Moisture separator
- Air Injection Blower: 5 HP - 140 SCFM
- Vapor Phase Carbon: First 2 years
- Period of Operation: August 1995 to Present;
  Shut off during Winter, Piping above ground - uninsulated

# Costs

| | |
|---|---|
| Costs: | $100,000 |
| Construction: | $150,000 |
| Operation & Maintenance: | $5,000/month |
| Testing (Analytical): | $50,000 |

# NWIRP Calverton -AS/SVE System

# NWIRP Calverton - AS/SVE System

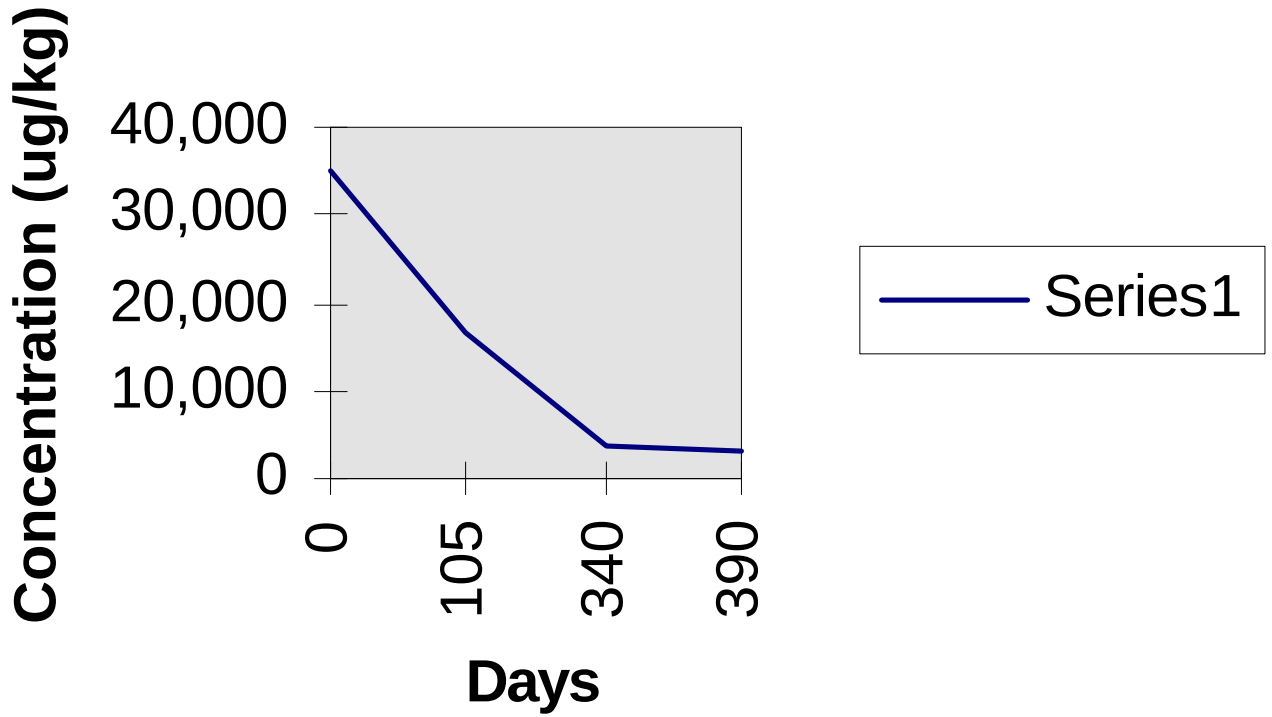
# Test Objective

- Objective
  - Determine effectiveness of an AS/SVE system to remediate site contaminants in the source area
- Goals
  - Evaluate removal and/or destruction of VOCs, SVOCs, PCBs, and pesticides in soils and shallow groundwater
  - Evaluate removal, destruction, and/or dispersion of floating free product layer

# Soil Results

- VOCs
  - For VOCs greater than 0.1 mg/kg:  52 to 91% reduction
  - For VOCs less than 0.1 mg/kg:  No conclusive trend
- SVOCs
  - For high SVOC concentrations:  80 to 99% reduction
  - For low SVOC concentrations:  No conclusive trend
- PCBs/Pesticides
  - No effect

# Soil Results (con't): VOC Concentration in SB 104, 1416



# Soil Results (con't)

- Hydrocarbons
  - As of December 1996, approximately 24,500 pounds of hydrocarbons destroyed
  - Free product layer is still present
- Conclusions
  - VOCs in soils generally in compliance with anticipated requirements
  - SVOCs (PAHs) remain above potential criteria (soil cap anticipated)

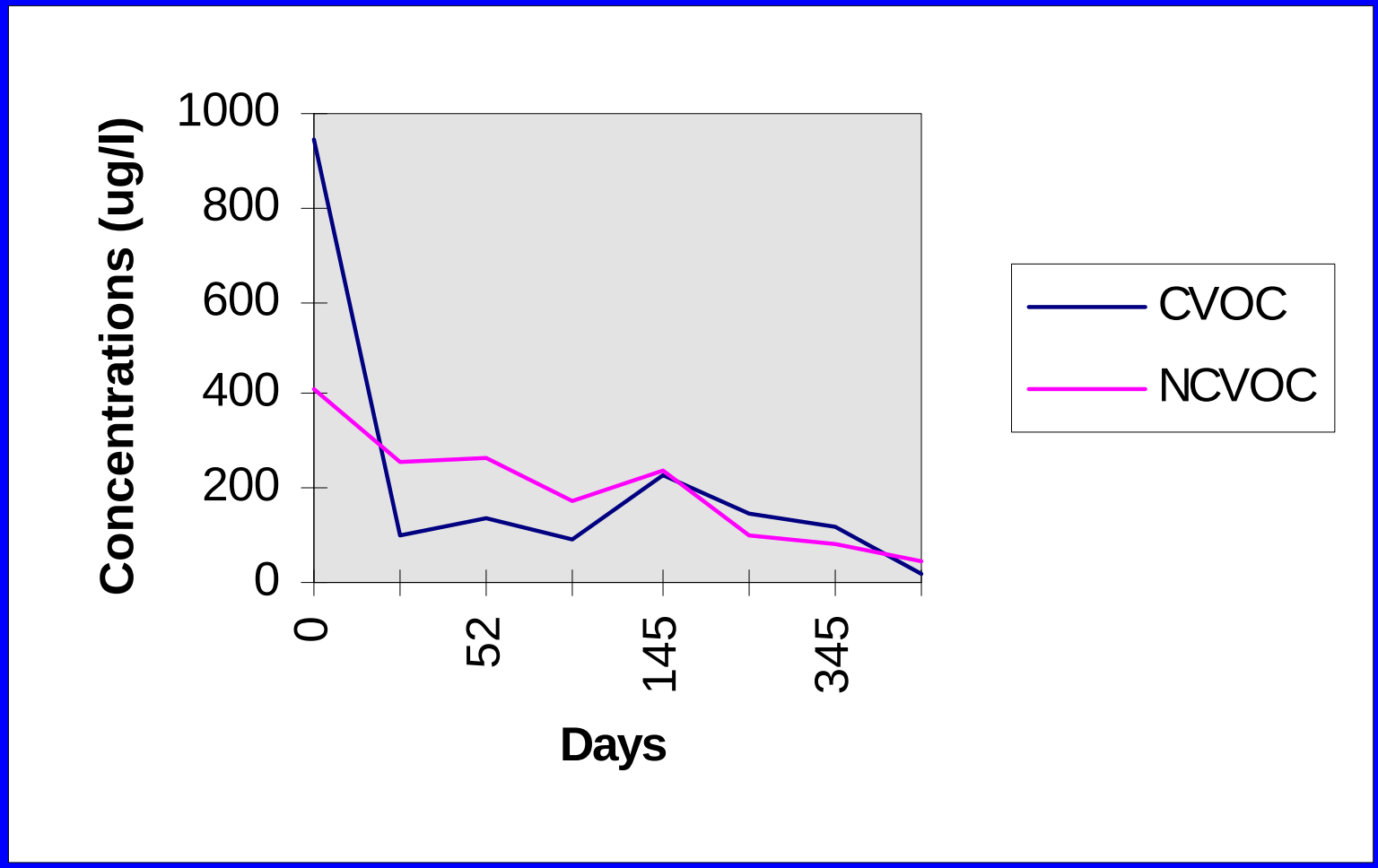
# Groundwater Results

- VOCs
  - For CVOCs: 98% reduction, 5 to 10% rebound noted after time
  - For NC-VOCs: 89% reduction, 5 to 10% rebound noted after time
- SVOCs
  - For SVOC: 89% reduction
- PCBs/Pesticides
  - No effect

# Groundwater Results (con't)

- Conclusions
  - Groundwater concentrations are within 10 to 20 times potential minimum groundwater standards
  - Need for addition remedy to be determined during Corrective Measure Study

# VOC Concentration in Groundwater Versus Time - Permanent Monitoring Well MW-02S



# Problems/Issues

- Power Supply
  - 220 volt - single phase - limited availability of adequate motor sizing
- Water Table Fluctuations
  - Water table elevation varied by 2 to 3 feet and resulted in loss of flow to some air injection wells
- Concentration Rebounds
  - VOC concentrations in groundwater partially rebounded
  - Free product may be a VOC reservoir
  - Also, as petroleum hydrocarbons breakdown, they may release biodegradation resistant chemicals
- Winterization
  - Frozen pipes

# Site Conditions - NWIRP Bethpage
# Former Drum Marshaling Area

| | |
|---|---|
| Geology: | Fine to course sand, with clay lenses |
| Groundwater: | 50 to 60 feet below ground surface |
| Terrain/Vegetation: | Flat, no vegetation |
| Setting: | Suburban, residents within 100 feet |
| Site Use: | Drum marshaling |
| | Industrial plant leachfield |
| Site Chemicals: | Soil contamination (3 acres - 87,000 CY) |
| | CVOCs to > 160 ppm |
| | PCBs to 1200 mg/kg |
| | Hazardous for TCLP Cd |
| | Groundwater contamination (1000+ acres) |
| | CVOCs to 14 mg/l |

# Site Conditions - NWIRP Bethpage
# Former Drum Marshaling Area (con't)

| | |
|---|---|
| Status: | ROD signed<br>Pilot scale unit and design complete<br>Full scale remedy under construction (April 1998)<br>AS/SVE to operate 2 years, followed by PCB and metal remediation |
| Offsite Issues: | Contamination extends several thousand feet offsite<br>Mixes with contamination from other sites.<br>Municipal wells impacted, well head treatment in place<br>Downgradient contaminant system installed |

# Setup

- 5 Soil Vapor Extraction Wells
- 1 Air Injection Wells
- 10 Monitoring Points
- Soil Vapor Extraction Blower:  7.5 HP - 180 SCFM
- Air Injection Blower:  7.5 HP - 60 CFM
- Vapor Phase Carbon

# Costs

| | |
|---|---|
| Costs: | $30,000 |
| Construction: | $50,000 |
| Operation & Maintenance: | $5,000/month |